

Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife

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Cobra Clubtail Dragonfly

Gomphus vastus

State Status: **Special Concern**

Federal Status: None

DESCRIPTION: The Cobra Clubtail is a large, semi-aquatic insect in the order Odonata, suborder Anisoptera (the dragonflies). They are members of the family Gomphidae (the clubtails), a large, diverse group comprising nearly 100 species in North America. Clubtails are named for the lateral swelling at the tip of the abdomen (the seventh through ninth segments) that produces a club-like appearance. The extent of this swelling varies greatly, from extreme to non-existent, depending upon the species. The club is generally more pronounced in males than females. The purpose of the club is uncertain, but it may be used for displays or it may provide some aerodynamic benefits to the males. Clubtails are further distinguished from other dragonflies by their widely separated eyes, wing venation characteristics, and behavior. Many species are very elusive and thus poorly known.

The Cobra Clubtail is in the subgenus *Gomphurus*, a group characterized by having the broadest clubs of any of the Gomphidae. Cobra Clubtails are dark brown dragonflies with pale yellow to greenish markings on the body and bright green eyes. The top of the thorax is marked with thick, pale stripes that form a rearward-facing U pattern. There are broad, pale, lateral stripes on the sides of the thorax. The pale thoracic markings are bright yellow in the young adults, but become a dull, grayish-green as the insect matures. The dark abdomen has thin, yellow markings on the tops of segments one through seven and bright yellow patches on the sides of the club. The face is dull yellowish with dark horizontal striping, and the legs are black. The sexes are similar in appearance, though the females have thicker abdomens and a less developed, though still prominent club.

Adult Cobra Clubtails range in length from 1.9 to 2.25 inches (47 mm - 57 mm), with a wingspan averaging 2.6 inches (66 mm). The fully developed nymphs average just over one inch in length (27 mm - 29.5 mm).

SIMILAR SPECIES: The Cobra Clubtail is one of three species in the subgenus *Gomphurus* in Massachusetts. The other two, the Midland Clubtail (*Gomphus fraternus*) and Skillet Clubtail (*G. ventricosus*) are very similar in appearance. As in most clubtails, the shape of the male hamules (located on the underside of the second abdominal segment) and terminal appendages, and the female vulvar laminae (located on the underside of the eighth and ninth abdominal segments) provide the most reliable means for identification. Cobra Clubtails can also be distinguished by dark cross-striping on the yellow face;



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Midland Clubtails and Skillet Clubtails both have unmarked yellowish faces. The Cobra Clubtail is entirely dark on the top of segment eight (Midland Clubtail has a yellow spot on the top of segment eight) and has a small pale spot on the front side of segment eight (Skillet Clubtail has a large yellow spot there).

The nymphs can be distinguished by characteristics of the palpal lobes on the labium, as per the keys in Walker (1958), Soltesz (1996), and Needham *et al.* (2000).

HABITAT: Cobra Clubtails inhabit large, sandy-bottomed rivers and large, wind-swept lakes. In Massachusetts, they are found along the Connecticut River. There is an historic record from the Merrimack River.

LIFE-HISTORY/BEHAVIOR: They have a rather long flight season with emergence beginning in early June and adults on the wing throughout the summer. The nymphs, like those of all dragonflies, are aquatic. They spend at least a year maturing, undergoing several molts during this period. They are voracious predators and feed upon a variety of aquatic life. When ready to emerge, the nymphs crawl out onto exposed rocks, emergent vegetation, partially submerged logs, or the steeper sections of river banks, where they undergo transformation to adults (a process known as "eclosion"). Exuviae have been found in numbers along stretches of the Connecticut River. Emergence generally takes place very early in the morning, presumably to reduce exposure to predation. The cast exoskeletons, known as

COBRA CLUBTAIL FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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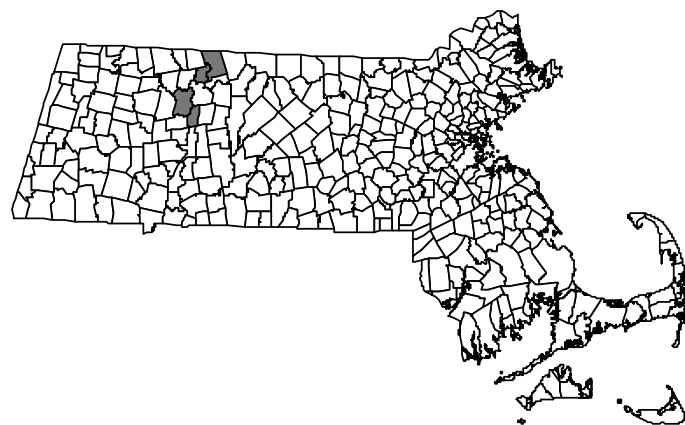
exuviae, are identifiable to species and can be a reliable, useful means to determine the presence of a species. As soon as the freshly emerged (teneral) adults are dry and the wings have hardened sufficiently, they fly off to seek refuge in the vegetation of adjacent uplands. Here they spend several days or more feeding and maturing, before returning to their breeding habitats. Cobra Clubtails are seldom encountered during this phase of their life; it may be that they spend most of this time high in the tree tops.

When mature, the males return to the water where they can be found resting on sandy stretches of shoreline, or perched on overhanging vegetation. Periodically they make flights out over the water, a foot or so above the surface, with frequent periods of hovering, presumably in search of females. Brief chases between competing males are frequent. During these patrolling flights, the male's abdomen is tilted upward at about a 30° angle. Females generally appear at water only for a brief period when they are ready to mate and lay eggs. When a male encounters a female, he attempts to grasp the back of her head with claspers located on the end of his abdomen. If the female is receptive, she allows the male to grasp her, then curls the tip of her abdomen upward to connect with the male's sexual organs located on the underside of the second abdominal segment, thus forming the familiar heart-shaped "wheel" typical of all Odonata — the male above, the female upside down underneath. In this position, the pair flies off to mate, generally hidden high in nearby trees where they are less vulnerable to predators. The duration of mating in Cobra Clubtails has not been recorded, but in similar-sized odonates typically ranges from several minutes to an hour or more.

Females oviposit by flying low over the water, periodically striking the surface with the tips of the abdomen to wash off the eggs. It is not known how long the eggs of Cobra Clubtails take to develop.

RANGE: Cobra Clubtails range throughout eastern North America from southwestern Maine, Quebec, Ontario, and Minnesota south to northern Florida, Alabama, and Texas. In New England they have been recorded from southwestern Maine, southern New Hampshire, Massachusetts, and Connecticut.

POPULATION STATUS IN MASSACHUSETTS: The Cobra Clubtail is listed as a Species of Special Concern in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing...) and sale under the Massachusetts Endangered Species Act. Virtually all Massachusetts records of Cobra Clubtail are from the Connecticut River, where it seems to be one of the more common Clubtails. There is one historical record from Tyngsboro, presumably associated with the Merrimack River, but there have been no records from that area since. Most recent records are from the Sunderland-Deerfield and Turner's Pool stretches of the Connecticut River, but this may simply reflect the preponderance of field work done along that section of the river.



Distribution in Massachusetts
1977 - 2002

Based on records in Natural Heritage Database

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact management needs of Cobra Clubtails are not known. With most odonates water quality is critical to their well-being, and Cobra Clubtails are undoubtedly no exception. Potential threats to the water quality of the Connecticut River include industrial and agricultural pollution, sewage overflow, salt and other road contaminant run-off, and siltation from construction or erosion. The impact of the disruption of natural flooding regimes by damming and water diversion projects on Cobra Clubtails and other riverine species is unknown but may be considerable. Extensive use of the river by power boats and jet skis is a serious concern, particularly during the early summer emergence period of Cobra Clubtails (as well as several other clubtail species). Many species of clubtails, as well as other riverine odonates, eclose low over the water surface on exposed rocks, emergent or floating vegetation, or steep sections of the river bank where they may be imperiled by the wakes of high speed watercraft as well as rapidly rising water levels, which swamp delicate emerging adults. Low-level recreational use from fisherman and canoeists probably has little impact on odonate populations, but should be monitored. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation, particularly for the teneral adults. Development of these areas should be discouraged, and the preservation of remaining undeveloped upland should be a top priority.

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